

West Nile Virus Surveillance at Military Installations in the Western US

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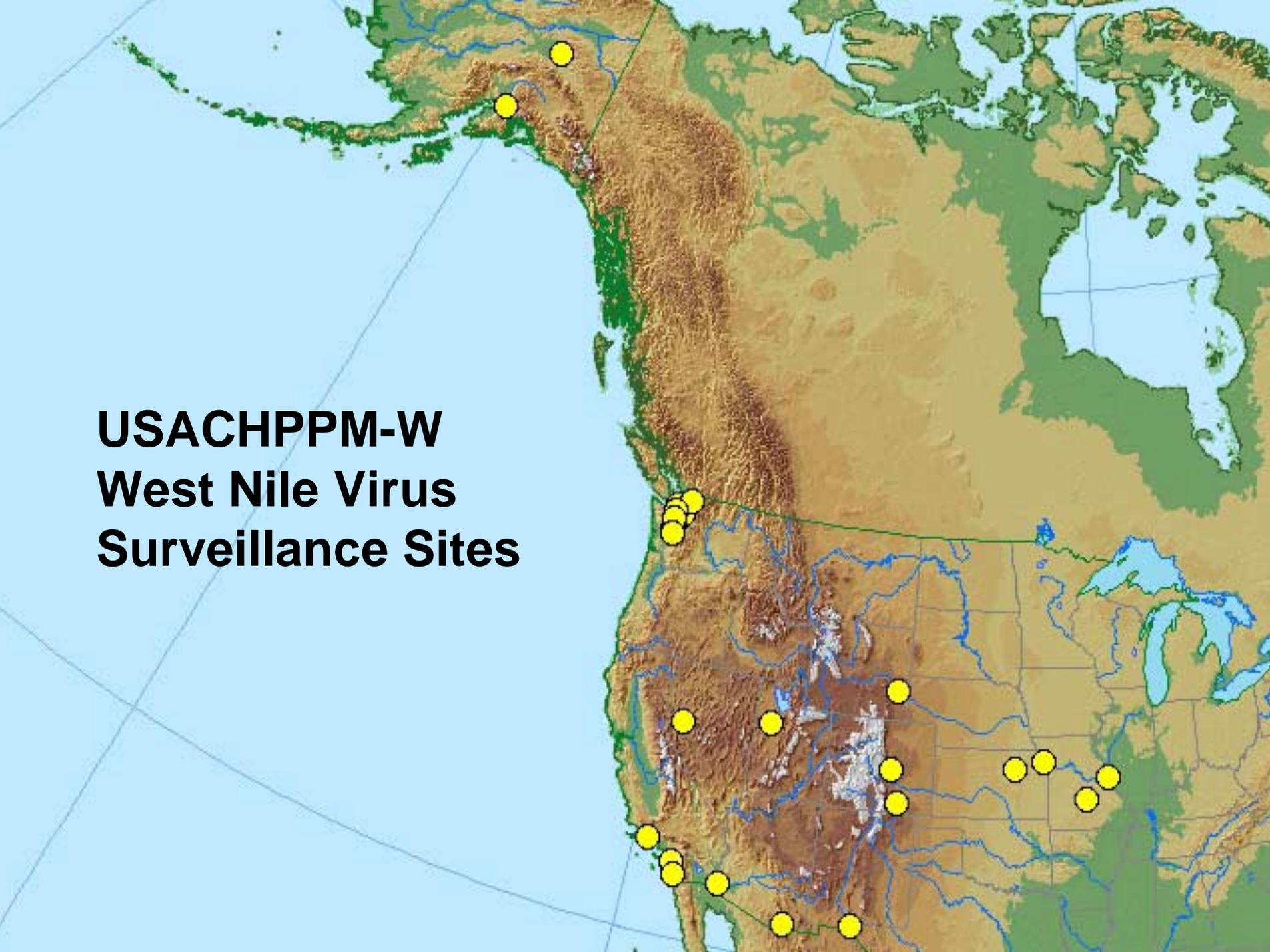
Surveillance

- Important tool for monitoring spread of disease
- Provides feedback for appropriate actions to prevent cases of West Nile virus

West Nile Virus Surveillance

- Reduce disease threat
 - Surveillance, Prevention (Education) & Controls
- Army regulations (AR 40-5)
 - Preventive Medicine
 - Facilities engineers
 - Environmental office
- Collaborations:
 - Army, USACHPPM
 - Navy, DVECC
 - Air Force, AFIOH
 - USGS
 - CDC
- Surveillance strategies
 - Mosquitoes (CDC, State DOH, USACHPPM, Universities)
 - Birds & Horses (USGS, State DOH, Army veterinarians, Universities)
 - Humans (CDC, State DOH, USAMRIID)

**USACHPPM-W
West Nile Virus
Surveillance Sites**



USACHPPM-West

West Nile virus surveillance sites

- 16 Navy installations
 - Washington (12)
 - Puget Sound area
 - California
 - Camp Pendleton
 - Ventura NS
 - San Diego MRD
 - Nevada
 - Fallon NAS

USACHPPM-West

West Nile virus surveillance sites

14 Army Installations

- Colorado
 - Fort Carson
 - Pinon Canyon
- Kansas
 - Fort Riley
 - Fort Leavenworth
- Missouri
 - Fort Leonard Wood
 - Weldon Springs RTA
- Arizona
 - Fort Huachuca
 - Yuma Proving Ground
- Texas
 - Fort Bliss
- Washington
 - Fort Lewis
- Wyoming
 - Camp Guernsey NGTA
- Alaska
 - Fort Richardson
 - Fort Wainwright
- Utah
 - Dugway Proving Ground

WNV Surveillance Capabilities

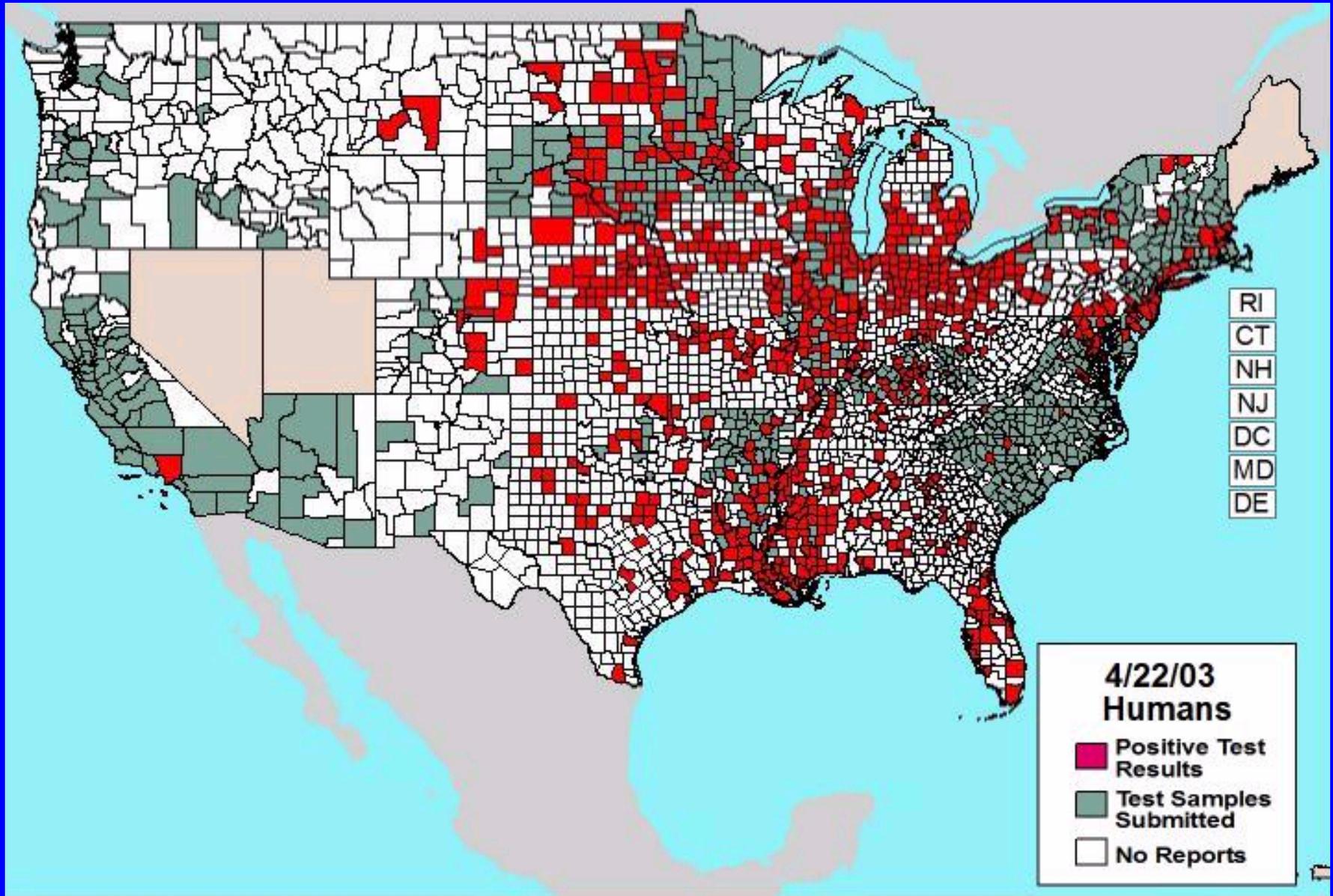
- Consultations
 - Surveillance training
 - Larval surveys
 - Adult surveys
 - Pest management
 - Preventive medicine
- Taxonomic Support
- WNV testing
- Collaborations



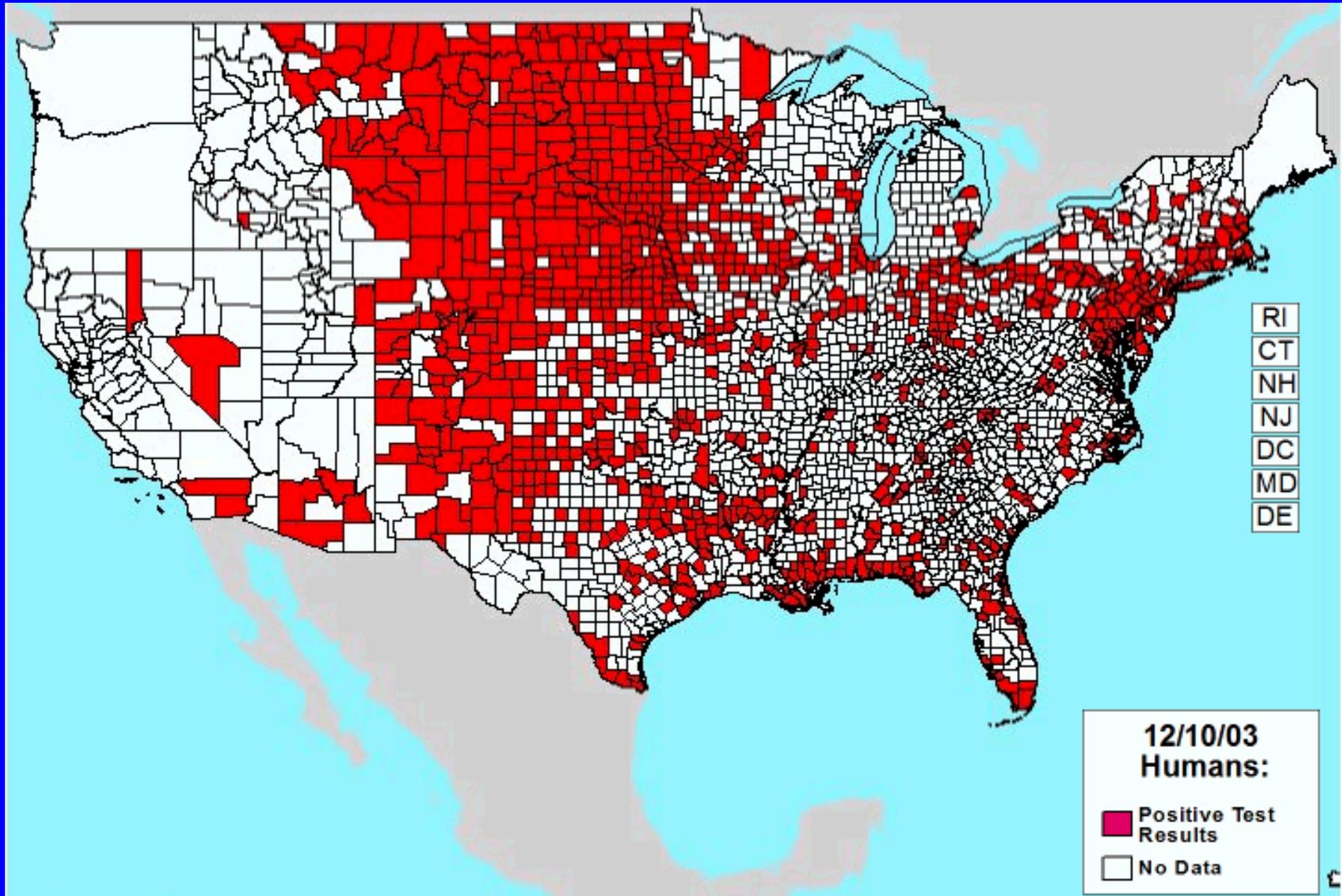
Surveillance Equipment



U.S. Counties Reporting Human WNV Disease Cases, 2002



U.S. Counties Reporting Human WNV Disease Cases, 2003



Culex tarsalis

- Overwinter as adults
- Most active dusk to dawn
- Lays eggs in almost any water
- No hatching latency
- Population gradually builds throughout year



Kansas

- **Kansas WNV Information**

- 8 Aug 02 first case (horse)
- 28 May 03 first case (mosquito)
- Bird and horse cases:
 - 2002
 - 170 + birds
 - 794 + equine cases
 - 2003
 - 142 + birds
 - 82 + equine cases
 - 2 positive crows at Ft. Riley
- 2002-03 Human Cases:
 - 2002 – 22 cases/no deaths
 - 2003 - 90 cases/5 deaths
 - 20 Jul – 7 Oct

- **2003 Fort Riley Mosquito Collections**

- 22 May - 24 Oct
- 219 Trap Nights/2977 female mosquitoes tested in 344 pools
- 175 *Culex tarsalis* tested in 46 pools
- 2 positive pools
 - Sep 3, 5
- *Other Culex sp. pools*
 - *Cx. salinarius* 50/0
 - *Cx. erraticus* 17/0
 - *Cx. pipiens* 8/0
 - *Cx. restuans* 21/0

Arizona

- **Arizona WNV information**

- 29 Jul 03 first case (mosquito)
- 12 Aug first Yuma area positive mosquito
- Bird and horse cases
 - 54 + Birds :
 - 137 + Horses 35-40% mortality
- First human non travel related case with onset 17 Sep
- Human Cases:
 - 2003 - 13 cases/1 death (travel related)

- **2003 Yuma PG Mosquito Collections**

- 5 May - 14 Nov
- 191 Trap Nights/5361 female mosquitoes tested in 253 pools
- 3913 *Culex tarsalis*
 - 148 pools tested
 - 3 positive pools
 - 7, 17, 22 Sep
- Other mosquito pools
 - *Cx. erythrothorax* 26/0
 - *Ps. columbiae* 31/0

Wyoming

- **Wyoming WNV Information**
 - 16 Aug 02 first case (horse)
 - 28 Apr 03 first case (bird)
 - Bird and horse cases peaked the week of 8 Aug 2003
 - + Birds: 28 Apr-9 Oct 2003
 - + Horses: 22 May-8 Oct 2003
 - First human death had onset about 8 Aug 2003
 - Human Cases: 30 May-14 Oct 2003
 - 2002 - 2 cases/no deaths
 - 2003 - 392 cases/9 deaths
- **2003 Camp Guernsey Mosquito Collections**
 - 23 May - 28 Sept
 - one night/month
 - 16 Trap Nights/7092 female mosquitoes tested in 169 pools
 - 2955 *Culex tarsalis*
 - 65 pools tested
 - 16 positive pools
 - 6 on 25 July
 - 10 on 17 August

Colorado

- **Colorado WNV Information**
 - 3 Aug 02 reported first case (bird)
 - 17 Jun 03 first case (bird)
 - Bird and horse cases:
 - 2002
 - 131 + Birds
 - 378 + Horses
 - 5 + birds at Fort Carson
 - 2003
 - 751 + Birds:
 - 598 + Equine cases
 - 9 + birds at Ft. Carson
 - Human Cases:
 - 2002 - 14 cases/no deaths
 - 2003 - 2833 cases/54 deaths
 - 11 Jun – 28 Oct
- **2003 Fort Carson & PCMS Mosquito Collections**
 - Ft. Carson: 29 May - 29 Oct
 - 189 Trap Nights/705 female mosquitoes, 169 pools
 - 441 *Culex tarsalis*, 88 pools
 - 8 positive pools
 - July 16, 18, 21, 25, & 30
 - Aug 4, 6, & 11
 - PCMS: 24 Jun – 21 Oct
 - 52 Trap Nights/370 female mosquitoes, 96 pools
 - 150 *Culex tarsalis*, 23 pools
 - 1 positive pool
 - Sept 10

Selected mosquito tested for WNV

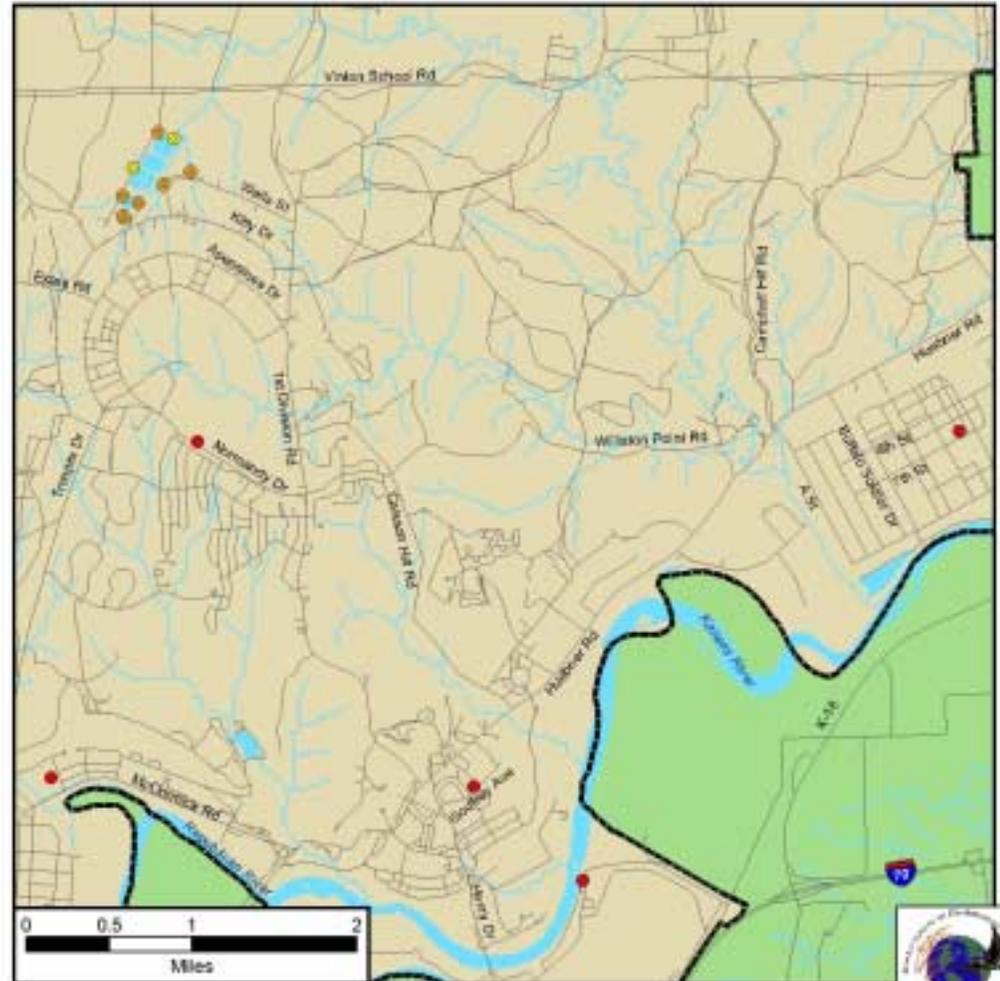
Number of mosquitoes: total pools/positive pools

• <i>Culex tarsalis</i>	8406:	482/30
• <i>Culex pipiens</i>	544:	67/0
• <i>Culex salinarius</i>	362:	75/0
• <i>Culex quinquefasciatus</i>	85:	21/0
• <i>Culex erythrothorax</i>	268:	40/0
• <i>Aedes vexans</i>	8213:	282/0
• <i>Culiseta inornata</i>	753:	110/0
• <i>Culiseta incidens</i>	155:	56/0
• <i>Psorophora columbiae</i>	921:	61/0
• 9 Genera 52 species	25742:	1763/30

ArcView GIS Mapping

- Human cases
- Mosquito collection sites
- Dead bird collections
- Habitat or vegetation types
- Mosquito breeding sites
- Treated areas
- Database management
- Population demographics

Fort Riley Mosquito Trap Locations for West Nile Virus Surveillance



USACHPPM-West Points of Contacts

- **Acting Chief, Entomological Science Division: Mr. Jim Harrison, (253) 966-0084**
- **Mosquito Surveillance Program Manager/WNv Field Operations: Mr. William Irwin (253) 966-0083**
- **Mosquito Identification: Mr. Francis Maloney (253) 966-0468**
- **Laboratory Director: Dr. Miguel Quintana (253) 966-3771**
- **WNv Mosquito Laboratory Operations: Ms. Milagros Sola (253) 966-3152**
- **Secretary: Ms. Sue Scott (253) 966-0008**

Conclusions

- *Culex tarsalis* is the main vector of WNV west of the Mississippi
- Mosquitoes are showing up positive in many areas before birds and horses
- Expand surveillance activities
- Education, Prevention, and Control methods need to be increased
- The public needs to be more involved with risk reduction methods

Questions

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